

### In the Specification

Page 2, lines 7 to 10 (underlining removed):-

A2  
Reference is here directed to Multiservice Switching Forum Contribution Number: MSF 99.245 (Multiservice Switching Forum System Architecture Implementation Agreement) available at [www.msforum.org](http://www.msforum.org), the contents of which are incorporated herein by reference.

Page 2, lines 28 to 36:-

A3  
According to another aspect of the invention, there is provided a communications network comprising a plurality of core nodes establishing a transport network, service nodes each coupled to a said core node to provide access to the transport network, and a network management system arranged to define and manage one or more virtual public/private networks within said communications network, wherein groups of said core nodes are configured as abstract nodes within which abstract nodes any available path may be selected to achieve a requested connection, and wherein end to end label switched paths are established via the management system by specifying a series of abstract nodes. [[.]]

Page 3, lines 4 to 7:-

A4  
MPLS has been defined by the IETF so as to be independent of the underlying transport mechanism. Mappings on to ATM have been defined as well as frame-mode networks using HDLC (~~Highland~~High-Level data link control) based or other forms of frame transport.

Page 7, lines 2 to 18:-

A5  
A management and bearer control function for the layer 1 physical network of figures 1 and 2 is illustrated in figure 3. This figure shows by way of example a simple network based on core nodes 18, constituting an abstract node 22, and service nodes 21. The real network has a management system based on a hierarchical structure of element managers 31 and (sub) network managers 32. The (sub) network manager 32 is responsible for constructing the abstract node information model representation of the network which it passes to a super-ordinate manager 33. A sub-ordinate manager 36 provides virtual switch management to perform fault, configuration, accounting, performance, and security management. The super-ordinate manager 33 is used for defining VPNs and placing traffic

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trunks to ~~realise~~realize those VPNs. The super-ordinate manager also creates, modifies and deletes virtual switches. Traffic trunk requests are passed to bearer control Layer 1 (34) to initiate the CR-LDP process, this is the bc reference point for Layer 1 for which the common open policy service protocol (COPS) is preferred. The Layer 1 bearer control function 34 could in some applications be de-coupled from the physical switch using a VSC (virtual switch control) reference point general switch management protocol (GSMP) interface.

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Page 8, lines 15 to 35:-

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In the case of a leased-line service network, the sub-ordinate manager 36 (figure 7) subsumes all of the functions in the control plane. Sub-ordinate manager 36 is the manager ~~36~~ able to use CR-LDP embedded in the network to control the virtual switch 41 implicitly by specifying the series of traffic trunks that the sub-ordinate manager wishes to use for the end-to-end connection. It then uses e.g. H.248 to configure an appropriate adaptation function and cross-connect this to the end-to-end CR-LSP. This procedure is illustrated schematically in figure 7. This sub-network manager could advantageously represent the whole virtual network as an abstract node, in which case end-to-end routing is fully controlled by the embedded CR-LDP function.

For the SIP based session-switched service network a proposal has been made to the IETF to consider ~~simple Internet protocol~~ Session Initiation Protocol (SIP) as a bearer control protocol for managing end-to-end CR-LSPs. The advantage of deploying SIP in this application is that it is able to explore multiple paths in parallel and to record the route taken. In the referenced document the recorded route of the preferred path is then used to initiate CR-LDP using COPS over the SP reference point, this is consistent with existing MPLS standards but in fact leads to a bearer control which requires two round trips of signalling to execute a connection. A preferred approach would be to use SIP at the IC reference point and GSMP at the VSC reference point which could execute a connection with a single signalling round trip. This preferred approach is illustrated in figure 8.